



Modernizing Our Industrial Base

The National Security
Challenge
of Our Time

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strong, responsive and healthy industrial base is critical to our national security and provides access to the world's best products, most innovative technologies and cutting-edge capabilities that have kept the United States military ahead of its adversaries for more than a half-century.

Industry is the cornerstone to maintaining this technology superiority and the freedom we enjoy as a result of it. By making forward-leaning research and development (R&D) investments and attracting the brightest and most innovative companies to serve and protect our national security, we have been able to win conflicts, deter conflicts and support humanitarian crises across the world. While our nation still enjoys the strongest, most advanced military, our competitive edge has narrowed and in some areas has been surpassed. The time to act to reverse this trend is now, and the Department of Defense's (DoD) Better Buying Power (BBP) 3.0 initiatives seek to do so by achieving dominant capabilities through technical excellence and innovation. These efforts will maintain our nation's status as the world's dominant player in technology innovation, manufacturing and industrial base capability.

The road to maintaining U.S. technological superiority has several challenges. Outsourcing of key technologies and a lack of innovation in manufacturing processes over the last several decades have eroded industrial capabilities here at home. Reductions in defense spending lead to declining critical investments across several sectors

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where maintaining design, build and manufacturing skills are important for the future. Additionally, as much of our workforce approaches retirement, the DoD and industry face a significant challenge in attracting our best and brightest into the national security space when we compete with the likes of commercial companies, which are hiring the next generation of sharp, technology-literate professionals. Last but not least, advancements in manufacturing have slowed in direct correlation with decreasing numbers of graduates with science, technology, engineering and mathematics (STEM) degrees. And, while all this happened here at home, the world caught up with or overtook us in several key areas.

Now more than ever, the DoD and the industrial base must work together and make the best business deal to benefit the taxpayer, allow for reasonable profit and provide the solutions we need to address our national security challenges. Revitalizing technology innovation must be at the forefront of this strategy in order to answer President Obama's call to action when he said in his 2010 National Security Strategy, "Simply put, we must see American innovation as a foundation of American power." We can accomplish this if we operate under the tenets of making the right investments, fostering innovation in government and industry, and reducing the barriers to doing business with the DoD.

Commercial technologies in programs: One focus of BBP 3.0 that can have tremendous impact on defense technology innovation is doing a better job of integrating commercial technologies into programs. Anyone who bought a new iPhone 5 in 2013 and now suffers from iPhone 6 envy can tell you that commercial products not only turn over quickly but become progressively more affordable. Any soldier using an outdated GPS system or sailor replacing 1,000-feet-long fiber optic cables, instead of one malfunctioning foot, will tell you they wish they could say the same for products coming out of the Defense Industrial Base (DIB). When we buy products in our private lives, we expect the best product at the cheapest price and to buy the next greatest product the following year at an even lower price. This is the mindset we need to instill in government and the defense industry, but that cannot happen if we do not find a faster and more efficient way to contract with industry for these commercial technologies.

The good news is that we see a dynamic marketplace and the need to engage with it differently. We know that the nature of conflict is changing and that it is risky not to change with it. Just as we developed and employed GPS, stealth, precision weapons and other force-multiplying capabilities in the 1980s and 1990s, we must do the same today for game-changing capabilities whose potential lies dormant within the DIB. We see many emerging technologies like advanced and longer-range weapons, situational awareness tools and applications, autonomy and robotics that we need to harness and fully develop for DoD missions. With this type of guidance well-articulated in BBP, the DoD is acting to develop and deploy the capabilities to meet future challenges.

One way the DoD is tackling these challenges is by diversifying who we consider to be part of the industrial base. When the term "Defense Industrial Base" is used, entrepreneurs, inventors and other nontraditional suppliers do not immediately come to mind. But including more nontraditional suppliers in the DIB will drive the development of innovative products that can meet our future requirements. The challenge is to devise the right policies, programs and business incentives to attract these players who have products and technologies we need but who would never consider doing business with the federal government because of the bureaucracy and red tape. Where appropriate, we need to remove inefficient policy that keeps the DoD from getting the best possible business deal.

The DoD has made some headway in addressing this area. Through the Small Business Innovation Research (SBIR) Program, the DoD awards more than \$1 billion per year to innovative small companies, with 25 percent of Phase One awards going to new entrants. This means that every four years we turn over our SBIR awards to new entrants, which has led to historically high commercialization rates for SBIR technologies in the government and private sector. We also established the Rapid Innovation Fund, which provides a rapid acquisition process to bring into the DoD innovative technologies that can be fielded into theater in support of the warfighter. Every year, through this program, the DoD invests \$225 million in products developed almost completely by small innovative businesses. We cannot predict innovation, but we can predict the things that cause it. That is why we need an open channel to industry that allows the DoD to pull the best ideas from inventors and entrepreneurs and to push our most complex challenges to them to find solutions.

Another frontier for developing cutting-edge manufacturing technology is through the National Network for Manufacturing Innovation (NNMI). This network of manufacturing institutes consists of public-private partnerships through a cooperative agreement in a one-to-one cost share with the government, which reduces barriers to rapid and efficient development and commercialization of new manufacturing technology, including manufacturing cybersecurity.

Through these public-private partnerships, the DoD, industry, universities and other federal agencies are establishing institutes that will develop, refine and expand production of pioneering capabilities. These technologies are in sectors ranging from additive manufacturing to development of lightweight metal technologies. The institutes not only will develop products and processes in the short term but ultimately will reinvigorate our industrial commons, provide a multidisciplinary link between manufacturing, design innovation, the education system and industry—which will lead to jobs and prosperity in America.

Today product designs are collaborated on within the cloud, rendered in a digital environment, virtually tested and certified and seamlessly manufactured throughout the supply chain.

Our Digital Manufacturing and Design Innovation Institute is developing technology innovations in this arena by focusing on the “digital thread,” which provides a way for digital information to securely flow across the life cycle of a manufactured product. This includes suppliers, customers, smart machines, and workers on the manufacturing floor. These investments are extremely important because innovation also occurs on the assembly line during the build phase, making modern manufacturing capabilities and mass production the principles that will allow our products to be competitive in the global marketplace

In its quest to modernize and sustain a healthy industrial base, the DoD also is looking outside our borders for the best solutions. Working with our allies, we are constantly looking for opportunities to leverage global commercial technologies, promote co-development of critical technologies, leverage research-and-development dollars through joint research, and encourage joint ventures between American and international companies where appropriate. As globalization and interconnected economies make the world smaller, working closer with our allies allows us to use our resources more efficiently, sustain our existing industrial capabilities and work across the world to maintain peace and stability while developing the greatest technologies.

The future of our workforce also is critically important. Innovation is related not only to technology but also to people, in terms of how they understand and perform their jobs and how we attract the best talent. An underlying theme in and critical prerequisite for asserting American technical dominance is a highly skilled talent pool capable of meeting the DoD’s current requirements, future goals and contingency plans. A major component of this is developing people with backgrounds in STEM. Approximately 45 percent of the federal government’s scientists and engineers work in the DoD, which demonstrates the critical need for these skill sets. Because DoD is a key customer of STEM-generated products, it has a responsibility to contribute to developing STEM-literate individuals and growing and maintaining that talent pool. STEM talent must be developed from the bottom up, including outreach to and access for underrepresented communities and availability of STEM education for Service members and their families.

Overall, if we want the benefits of an efficient and effective workforce, we need the innovative next generation of professionals to be a part of it. Right now, many of our most talented engineers, software developers and scientists are not coming to work for the DoD or its industrial base; rather they go to work in the commercial industry for companies such as Facebook, Google and Tesla. This happens for a variety of reasons, including the government’s work environment and hiring practices and the type of forward-leaning thinking that can be found in places like Silicon Valley. The reality is that the federal government cannot compete with the commercial sector for this motivated pool of talent. We must find a way to use

flexible hiring authorities to bring on the talent we need and to create an environment that does not stifle creative thinking.

There also is much that can be done within the DoD’s acquisition workforce. The DoD has developed workforce training to increase professionalism and creative thinking and it is utilizing flexible contracting authorities to help acquire expertise to meet all of its requirements. In order to identify current and future suppliers with the capabilities we need, the acquisition workforce must perform targeted, insightful market research powered by advanced business intelligence. To enable effective market research and identification of our most critical suppliers and fragile sectors, the DoD, for the first time, is deploying business intelligence tools utilizing big data principles to allow its workforce to leverage the latest technologies and analysis techniques. This will promote more competition and key investment in areas where the DoD must maintain industrial capability. Lastly, DoD created the website business.defense.gov as a one-stop shop for industry and the acquisition workforce, to serve as a portal at the intersection between business and defense inside the DoD.

Ultimately, none of this can be achieved without a dynamic partnership with industry. The DoD continues talking to industry, communicating our vision for the future, to facilitate the best business decisions that align industry’s goals with DoD’s objectives. As the DoD looks inward to address its challenges, it is equally important for the DIB to play its role in driving innovation and developing cutting-edge products. Industry should use its reimbursed and independent R&D dollars to make real investments in its businesses’ future. Using these resources for bid and proposal activities or to keep idle teams on standby is not in the best interest of the DoD or shareholders who would like to see a growing, vibrant defense industry. The DoD wants to see tangible investments and an understanding that innovation requires more than just acquiring new or novel businesses that already have developed an innovative technology or product. Both traditional and nontraditional suppliers should align their visions with that of the DoD as it shifts toward achieving dominant capabilities through innovation and technical excellence.

Modernizing the DIB: To ensure that our nation maintains its strategic industrial capabilities, modernizing the DIB is one of this century’s greatest national security challenges. How we approach these challenges will determine the strength of our military, the resilience of our economy, and our place in the community of nations for the next several decades. Failure is not an option; we can meet this challenge through cooperation and partnership. There is no silver-bullet solution. But if we invest in the right areas, innovate new technologies and inspire our brightest minds to enter national security-related fields, our nation will continue to lead the world and support maintaining peace and stability for decades to come. &

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